

**AMENDMENTS TO THE CLAIMS**

A listing of all claims and their current status in accordance with 37 C.F.R. §  
1.121(c) is provided below.

1. (currently amended) A method of monitoring a polyolefin production  
process, comprising:

placing a spectroscopic probe of a low-resolution Raman spectroscopic system into  
a conduit of a polyolefin production system, the conduit contents  
comprising at least one of a feedstock, a feed stream, a reactor discharge, a  
recovered component, a purified component, a polymer fluff, an extruder  
feed, or a polymer pellet stream;  
exposing the conduit contents to a radiation emission from the spectroscopic probe;  
acquiring a spectroscopic signal in substantially real-time from the conduit contents  
in response to the radiation emission via the spectroscopic probe;  
analyzing the spectroscopic signal to determine at least one property of interest of a  
component of the conduit contents; and  
adjusting a product shipment in response to the property of interest.

2. (cancelled)

3. (original) The method as recited in claim 1, wherein the feedstock comprises at least one olefin monomer.
4. (previously presented) The method as recited in claim 1, wherein the feed stream comprises at least one of an olefin monomer, a comonomer, a chain transfer agent, a diluent, a catalyst, a co-catalyst, or an additive, or any combination thereof.
5. (previously presented) The method as recited in claim 1, wherein the reactor discharge comprises the polymer fluff, an olefin monomer, a comonomer, a catalyst, or a diluent, or any combination thereof.
6. (previously presented) The method as recited in claim 1, wherein at least one of the recovered component and the purified component comprise an olefin monomer, a comonomer, a catalyst, or a diluent, or any combination thereof.
7. (original) The method as recited in claim 1, wherein the polymer fluff comprises a polymer fluff blend.
8. (original) The method as recited in claim 1, wherein the polymer pellet stream comprises a mixture of polymer pellets.

9. (previously presented) The method as recited in claim 1, wherein the extruder feed comprises at least one of the polymer fluff, an additive, or a peroxide, or any combination thereof.

10. (original) The method as recited in claim 1, wherein the property of interest comprises a chemical concentration of the component.

11. (previously presented) The method as recited in claim 1, wherein analyzing the spectroscopic signal comprises analyzing the spectroscopic signal using one or more chemometric models and the property of interest comprises a percent solids, a mechanical property, a chemical property, a rheological property, or a thermal property of the component, or any combination thereof.

12. (Original) The method as recited in claim 1, further comprising adjusting the composition of the conduit contents in response to the property of interest.

13. (previously presented) The method as recited in claim 1, further comprising adjusting the operation of a reactor feed system, a polymerization reactor system, a monomer recovery system, an extruder feed system, or an extruder pelletizer, or any combination thereof, in response to the property of interest.

14.-28. (cancelled)

29. (currently amended) A polyolefin production system, comprising:  
~~a reactor feed system configured to receive one or more feedstocks via a first set of conduits and to output one or more feedstreams via a second set of conduits;~~  
a polymerization reactor system configured to receive ~~the~~ one or more feedstreams ~~via the second set of conduits~~ and to output a reactor discharge stream ~~via a third set of conduits;~~  
a ~~monomer recovery system~~ flash vessel configured to receive the reactor discharge stream ~~via the third set of conduits~~ and to output an overhead stream ~~comprising one or more recovered components via a fourth set of conduits and a polymer fluff via a fifth set of conduits;~~ and  
~~one or more spectroscopic probes of one or more~~ a low-resolution Raman  
spectroscopy system[[s]] comprising a spectroscopic probe and ~~situated in~~  
~~at least one of the first, second, third, and fourth set conduits~~ configured to  
acquire a spectroscopic signal in substantially real time to determine a  
chemical concentration of a recovered component in the overhead discharge  
stream, wherein at least a portion of the spectroscopic probe is situated in  
the overhead discharge stream in an upper portion of the flash vessel or in a  
conduit coupled to an upper portion of the flash vessel, or a combination  
thereof.

30-31. (cancelled)

32. (previously presented) The polyolefin production system as recited in claim 29, wherein the one or more feedstreams comprise an olefin monomer, a comonomer, a chain transfer agent, a diluent, a catalyst, a co-catalyst, or an additive, or any combination thereof.

33. (currently amended) The polyolefin production system as recited in claim 29, wherein the reactor discharge stream comprises the polymer fluff, an olefin monomer, a comonomer, a catalyst, or a diluent, or any combination thereof.

34. (previously presented) The polyolefin production system as recited in claim 29, wherein the one or more recovered components comprise at least one of an olefin monomer, a comonomer, a catalyst, or a diluent, or any combination thereof.

35. (cancelled)

36. (currently amended) A method of monitoring a polyolefin production process, comprising:

placing a Raman spectroscopic probe into a conduit of a monomer recovery system

of a polyolefin production system, wherein the conduit is coupled to an

overhead discharge of a flash vessel in the monomer recovery system;

exposing contents of the conduit ~~or vessel~~ to a radiation emission from the

spectroscopic probe;

acquiring a spectroscopic signal in substantially real-time from the contents in  
response to the radiation emission via the Raman spectroscopic probe; and  
analyzing the Raman spectroscopic signal to determine at least one property of  
interest of a component of the conduit contents.

37. (previously presented) The method of claim 36, wherein the conduit  
contents comprise ethylene, diluent, and 1-hexene.

38. (previously presented) The method of claim 37, wherein the component  
comprises ethylene and the at least one property of interest comprises a concentration of  
the ethylene in the conduit contents.

39.-41. (cancelled)

42. (previously presented) The method as recited in claim 1, wherein the feed  
stream comprises a catalyst.

43. (previously presented) The polyolefin production system as recited in claim  
29, wherein the polymerization reactor system comprises a loop reactor.